INCH-POUND

MIL-PRF-49368C (CR)
4 March 1999
SUPERSEDING
MIL-L-49368B(CR)
27 May 1992

# PERFORMANCE SPECIFICATION

# LENS ASSEMBLY, EYEPIECE, AN/PVS-4 AND AN/TVS-5

This specification is approved for use by US Army Communications-Electronics Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification covers the Lens Assembly, Eyepiece, AN/PVS-4 and AN/TVS-5 (see 6.1).

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements in sections 3 and 4 of this specification, whether or not they are listed.

Beneficial comments (recommendation, additions, deletions) and any data which may be of use in improving this document should be addressed to HQ, USA Communications-Electronics Command ATTN: AMSEL-LC-LEO-E-EP Fort Monmouth, NJ 07703-5023 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5855

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

2.1.2 Reference documents, drawings and publications. The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation (see 6.2.d).

DRAWINGS

USA COMMUNICATIONS-ELECTRONICS COMMAND

SM-D-850400 - Lens Assembly, Eyepiece, AN/PVS-4 and AN/TVS-5

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description. The Lens Assembly, Eyepiece, herein referred to as the eyepiece assembly, is part of the Night Vision Sight, Individual Served Weapon, AN/PVS-4 and Night Vision Sight, Crew Served Weapon, AN/TVS-5.

3.2.1 First Article Testing (FAT). When specified in the contract or purchase order (see 6.2.f), the contractor shall furnish FAT eyepiece assemblies for inspection and approval (see 4.2).

3.3 Construction. The eyepiece assembly shall be constructed to assure compliance with the contract configuration baseline and in accordance with SM-D-850400 as applicable.

3.4 Material. The contractor shall select parts and materials that are fully capable of meeting all of the operational and environmental requirements specified herein. The materials specified in the applicable drawings are recommended, but not mandatory. Selection criteria of the class, grade or type part shall ensure the material will be able to perform its intended function when it is assembled. Verification of the supplier meeting the overall performance requirements shall be the governing acceptance standard. Recovered materials shall be used to the maximum extent possible.

3.5 Components. The eyepiece assembly shall consist of optical components assembled within a housing as specified on the drawings.

3.6 Performance characteristics.

3.6.1 Effective focal length. The effective focal length shall be 26.5, ± 0.3mm.

3.6.2 Flange focal distance. The flange focal distance of the eyepiece assembly at zero diopter shall be 4.753 ± 0.207, -0.435mm.

3.6.3 Field curvature. The field curvature of the eyepiece assembly shall deviate no more than ±1/4 diopter over the full 25mm flat format.

3.6.4 Linear distortion. The linear distortion of the eyepiece assembly shall be between 0 and 9 percent pincushion distortion at the edge of the 25mm format.

3.6.5 Exit pupil. The exit pupil diameter shall be 5.0, ± 0.2mm at eye relief of 28.0, ± 0.5mm.

3.6.6 Transmission. The transmission of the eyepiece assembly shall be not less than 80 percent over the full eyepiece assembly aperture for the spectral output of the P-20 phosphor.

3.6.7 Resolution. The eyepiece shall have an on-axis resolution of not less than 50 lp/mm. The resolution measurement shall be made using a 2856K light source filtered to simulate the phosphor.

3.6.8 Diopter adjustment. The diopter adjustment shall operate smoothly, without binding, throughout its complete range of movement at all operating temperatures specified herein. Dynamic torque shall be between 2 and 20 inch-pounds.

3.6.9 Diopter range. The eyepiece assembly focus range shall not be less than 8 diopters when one rotational stop is set at -6 (+1/4 -0) diopters.

3.7 Environmental.

NOTE: Post-environmental verification of performance shall be Exit pupil (3.6.5), Transmission (3.6.6) and Resolution (3.6.7). Failure to meet these requirements shall constitute failure due to degradation of performance of input or output characteristics per the damage technical interpretation of 3.10.1.

3.7.1 Temperature Extremes. The eyepiece assembly shall not be damaged (see 3.10.1) after storage in any temperature from -51°C to +68°C. The eyepiece assembly shall not be damaged (see 3.10.1) after being subjected to repetitive temperature changes between +23°C and +68°C in 5 minutes and between +23°C and -51°C in 5 minutes. The transition from +68°C to -51°C and from -51°C to +68°C shall include a 2 hour soak at +23°C. Soak time at temperature extremes shall be sufficient for the entire eyepiece assembly to attain stabilization.

3.7.2 Vibration. The eyepiece assembly shall not be damaged (see 3.10.1) after being subjected to simple harmonic motion having an amplitude of 0.015 inch (0.03 inch total excursion) with the frequency being varied between 5 and 55 hertz (Hz). Vibration shall be applied in 3 mutually perpendicular planes, one of which is perpendicular to the optical axis. The duration of vibration shall be 5 minutes in each plane.

3.7.3 Altitude. The eyepiece assembly shall not be damaged (see 3.10.1) after storage at a pressure equivalent to 10,000 feet altitude above sea level.

3.7.4 Humidity. The eyepiece assembly shall not be damaged (see 3.10.1) after storage up to +68°C minimum with 95 ± 5 percent relative humidity.

3.7.5 Immersion. The eyepiece assembly shall not be damaged (see 3.10.1) after being immersed in fresh water to a depth of not less than 3 feet for a period of not less than 30 minutes. The eyepiece assembly shall be pre-conditioned by exposure to a temperature of +45°C ±3°C for a period of 2 hours prior to being immersed in the fresh water at a temperature of +18°C ±5°C.

3.7.6 High intensity shock. The eyepiece assembly shall not be damaged (see 3.10.1) by a sequence of 3 shocks applied in each direction along each of 3 mutually perpendicular axes (horizontal, vertical, and optical axis when the reticle pattern is erect). The shocks shall be half sine pulses and shall have a time duration of 4 milliseconds ±5 percent. Shock pulses applied along the axes horizontal and perpendicular to the optical axis shall have a peak amplitude of 50g's ±15 percent (see 3.10.2). Shock pulses applied along the optical axis shall have a peak amplitude of 100 ±15g's.

3.8 Marking. Marking shall be in accordance with applicable drawings unless otherwise specified in the contract or purchase order.

3.9 Workmanship. Workmanship standards shall be such that the eyepiece assembly will meet all requirements of this specification and any referenced specifications or drawings.

3.10 Technical interpretations. The following technical interpretations, when referenced in sections 3 or 4, are mandatory for this specification.

3.10.1 Damage. Breakages, loosening, shifting, evidence of corrosion or failure of any finish, hardware, connection or component; leakage or condensation of moisture within the eyepiece assembly; or degradation in input or output characteristics.

3.10.2 "g". "g" is defined as an acceleration or deceleration of 32.17 feet per second per second.

3.10.3 Ambient temperature. Ambient temperature is defined as +23°C ± 10°C.

3.10.4 Environmental temperature. Environmental chamber temperature shall be controlled within ±5°C of the specified temperature unless otherwise specified.

4. VERIFICATION

4.1 Classification of inspection. Inspection shall be classified as follows:

a. First article testing (4.2).
b. Conformance inspection (4.3).

4.2 First article testing. When specified in the contract or purchase order (see 6.2.f) first article testing shall be performed by the contractor. The quantity of initial production test samples shall be as specified in the contract or purchase order (see 6.2.b).

4.2.1 FAT Testing. Each eyepiece assembly in the FAT lot shall be subjected to the inspections of Table I. Samples selected from the lot shall be subjected to the inspections of Table II. Sample size shall be as specified in the contract or purchase order (see 6.2.b). Failure of any inspection shall be cause for rejection of that eyepiece assembly and may be cause for rejection of the FAT. Inspections may be performed in any order except for Immersion, which shall follow temperature extremes and temperature shock.

Table I Unit first article testing.

| Inspection | Requirement Paragraph |
|---|---|
| Effective focal length | 3.6.1 |
| Flange focal length | 3.6.2 |
| Field curvature | 3.6.3 |
| Linear distortion | 3.6.4 |
| Exit pupil | 3.6.5 |
| Transmission | 3.6.6 |
| Resolution | 3.6.7 |
| Diopter adjustment | 3.6.8 |
| Diopter range | 3.6.9 |

Table II Sample first article testing.

| Inspection | Requirement Paragraph |
|---|---|
| Temperature Extremes | 3.7.1 |
| Vibration | 3.7.2 |
| Altitude | 3.7.3 |
| Humidity | 3.7.4 |
| Immersion | 3.7.5 |
| High intensity shock | 3.7.6 |

4.2.1 Disposition of FAT samples. Disposition of FAT samples shall be as specified in the contract or purchase order (see 6.2.b).

4.3 Conformance inspection. Requirements for conformance inspections shall be as specified in the contract or purchase order (see 6.2.e). Unless otherwise specified, all tests shall be performed at ambient temperature (see 3.10.3).

## 5. PACKAGING

5.1 Packaging requirements. Packaging and preservation shall be best commercial practice unless otherwise specified in the contract or purchase order (see 6.2.g).

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The eyepiece assembly is used for aimed firing at night with the Night Vision Sight, Individual Served Weapon, AN/PVS-4 and the Night Vision Sight, Crew Served Weapon, AN/TVS-5.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of specification.

b. Quantity and schedule for FAT testing and disposition of FAT samples.

c. Necessary actions by the contractor in the event of a lot failure (see 4.5.4).

d. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.1.2.)

e. Statement identifying that the contractor must submit his proposal for conformance inspection to include specific requirements to be verified and the sampling plan to be used to provide the desired confidence level.

f. Statement specifying that FAT testing is, or is not, required and sampling requirements for FAT.

g. Packaging and preservation (see section 5).

6.3 Definitions. See 3.10

6.5 Subject term keyword listing.
Eyepiece
Eyepiece assembly

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensive changes.

Custodian:
Army - CR

Preparing Activity:
Army - CR

Project 5855-0199

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

**INSTRUCTIONS**

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

| **I RECOMMEND A CHANGE:** | **1. DOCUMENT NUMBER**<br>MIL-PRF-49368C (CR) | **2. DOCUMENT DATE (YYMMDD)**<br>990304 |
|---|---|---|

**3. DOCUMENT TITLE**
Lens Assembly, Eyepiece, AN/PVS-4 and AN/TVS-5

**4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)**

**5. REASON FOR RECOMMENDATION**

**6. SUBMITTER**

| a. NAME (Last, First, Middle initial) | b. ORGANIZATION | |
|---|---|---|
| c. ADDRESS (Include Zip Code) | d. TELEPHONE (Include Area Code)<br>(1) Commercial<br>(2) AUTOVON (If applicable) | 7. DATE SUBMITTED (YYMMDD) |

**8. PREPARING ACTIVITY**

| a. NAME<br>US Army Communications-Electronics Command | b. TELEPHONE (Include Area Code)<br>(1) Commercial (732) 532-9129<br>(2) AUTOVON 992-9129 |
|---|---|
| c. ADDRESS (Include Zip Code)<br>ATTN: AMSEL-LC-LEO-E-EP<br>Fort Monmouth, NJ 07703-5023 | **IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:**<br>Defense Quality and Standardization Office<br>5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466<br>Telephone (703) 756-2340 AUTOVON 289-2340 |